When we confirmed our model, we placed a well in the Frasier Seam and the Landsburg Seam that -- basically, to the east and to the west of the mine, that had contamination placed in it. And this was to see if replacing the mine workings made a fracture, or a hole, so that migration of contaminants had occurred. In a very highly conductive environment, we should be able to detect something with very low detection levels. We're looking at part-per-billion detection levels for compounds. But it takes very minor amounts. We should be able to see something in our screening process.

So the wells were placed, essentially, to be right in the periphery of this Black Box that we talked about, in this recent mine; how close can we set the wells around this so we can see if anything is coming out of that box, that Black Box.

UNIDENTIFIED SPEAKER: The Black Box, as I have heard you describe it, it was quite large?

MR. PANCOAST: The mine is fairly large. It's about a mile in length. And the seam down there, the workings, are about 12 to 15 feet wide, and they go down about 750 feet. So it's -- it's fairly large; you know, kind of tabular kind of shape.

UNIDENTIFIED SPEAKER: Well, I guess the question I'm leading up to is, you haven't had any evidence of migration outside the Black Box?

MR. PANCOAST: Right.

UNIDENTIFIED SPEAKER: But do you have any information on the rate that migration is occurring within the Black Box, and, over a period of time, five years, 10 years downstream, if it would reach the perimeter of the Black Box and possibly --

MR. PANCOAST: Right. Right. This is something that we had to look at; in other words, if there is something in motion within the Black Box. And so we had to look at ground water; what's the effect of, essentially, rainwater hitting the top of this thing, going down through there, getting into the ground water, and then flowing out.

And the ground water movement through the mine is very, very rapid. We put electronic instruments in the various wells, that allow us to monitor the water level changes. And we see almost instantaneous water level change with rain events. We did some infiltration studies where we dumped a massive quantity of water. We see a very fast response in the wells -- evaporating from that -- where that water is the cause of it. So anything that has gotten to ground water would move very rapidly, a matter of hours to days, you know, no more than weeks, out of the entire system.

And so that's, really, one of the things that begs what happened to the contamination. A lot of this flowed -- it's flowed out of the system. And if you have a lot of rain, it's just basically washing out, on its way to be absorbed into coal. So a lot of these things -- tanker trucks probably dump there. They flow very rapidly out the system. Most of the other material that's there, there is probably very little in the way of liquids.

And these things are dumped, you know, 40, 50 feet down the hill where they are busting open. They are into now, somewhat, a sitting environment for a period of time; 20, 30 years. You know, pin holes develop very rapidly. And if you have them out in the backyard five, 10 years, it starts leaking. So there was probably not much in the way of any type of liquids that are going to flow out.

What our concern was, if we had some sort of sludge or materials there, that we want to make sure we don't have anything with the ground water -- with the rainwater flowing down through there that would carry something into the ground water that we'd have to take out. And so that we prevent the driving force of the rainwater, and we should not, really, experience anything immediately going to a water tank. And with monitoring, we have the ability to see, you know, how the system is performing and if there are any changes in the system over time. Does that answer your question?

UNIDENTIFIED SPEAKER: Yes.

MS. MELEWSKI: The same wells that we were just talking about, the shallow and the deep, how often are they monitored? How often did you test them? Is it a one-year period? And how?

MR. PANCOAST: We tested for four quarters during that. And the quarters were picked to look at different water levels. When it was kind of summer, you know, what spring rain events, the fall, the winter, and the spring. So we're looking at seasonal variations within the hydrogeologic system.

So we look at four quarters. It allows us to see if there is any variance due to a lot of rain falling, to drive anything down that we don't see later on. Was there any change when we get to the dry season, and the water levels drop. So four quarters were done on most of the private wells and on the sediments along there.

MS. MELEWSKI: So basically, the same. On Alternative No. 5 where you have the drainpipes and the diverted water, where does that go?

MR. PANCOAST: That would be referred to the engineering design area. They probably would go with some sort of infiltration area. That's, basically, clean rainwater that's coming off the side of the hill, and so we would redirect that. Right now, it flows in and flows back a-ways and in creeks and out the Cedar River. Probably, through tide-line pipes and through ditches, we just have to divert the water to come out --

MS. MELEWSKI: So this is clean water?

MR. PANCOAST: This is clean water. Spring water is coming down. We just didn't want rainwater coming down the side of the hill and into the trench, which is a --

MS. MELEWSKI: And on No. 5, I notice it said the cap would be maintained for 20 years. Well, after 20 years, what's going to happen? Is a housing development going to go in, or you

grow trees and new timber, or -- you know, 20 years, to me, doesn't sound very long.

MR. PANCOAST: Yeah. I understand. Twenty years is a good number in terms of being able to see if there is any changes, because we're going to apply some loads, we're going to be doing some earth work and stuff, so we want to see if there is changes.

In terms of houses being built, there is not going to be houses ever built in the cap. There is some deep restrictions going with it. There also is, just simply, laws in King County now that prevent you from building structures and developing land over the top of coal mines. So it's -- it, basically -- and we can direct this to Bill Kombol, as far as land. But it probably would be in that state for perpetuity -- I mean, the laws.

UNIDENTIFIED SPEAKER: One of the advantages of the soil cap, and one of the reasons we recommended that over the effort now, is that, soil being a natural material, it's going to -- well, the FML will stay around, too. But soil is going to stay around. The cap is not going to disappear at the end of 20 years. It's going to stay there. So you're going to have this protection and perpetuity. What ends at 20 years is someone going out, looking at it, and saying that it's still there. There is no reason to believe that it's going to be gone in a couple of years.

MS. MELEWSKI: Bill, what did you say on -- what is the future use for the property? What do you see happening? Would you use it for --

MR. KOMBOL: Future use for the property? Given the 750-foot trench with voids in it, I can't think of a lot of great uses for it.

MS. MELEWSKI: How deep will the trench be after it's capped?

MR. KOMBOL: The trench would be zero, but the grass would stay 750 feet.

MR. SOUTH: My grass is -- he should have said "750-foot trench."

MR. KOMBOL: Above the filter.

MR. SOUTH: The trench, itself, is open. It's only eight feet.

MR. PANCOAST: Yeah. The trench now, it looks like it's about seven to eight feet deep. Some of the steep sides, the walls will be knocked down. I don't know that the trench would come all the way up towards the old surface, but we might knock down some of those steep sides and kind of build that up and be crowned. But it'll certainly have a much more general aspect to it rather than a very steep hill and trench that goes down.

MR. SOUTH: And so there are no surprises, we're talking about that portion of the trench in which waste disposal occurs, which is the subject of this investigation. I don't believe that there are plans to do that for the entire three-quarter-mile length of trench.

MR. PANCOAST: That's correct. There simply is no waste --

MR. SOUTH: There is no waste placed there, and addressing the abandoned mine lands outside of the waste areas would have to come through the office of surface mining and various other sources, not including what we're doing in Ecology.

UNIDENTIFIED SPEAKER: There is at least one benefit for the community, and that is removing the safety hazard that's there. That would be, essentially, minimized.

MR. PANCOAST: Yeah. Although it is fenced.

UNIDENTIFIED SPEAKER: I don't understand why you're going to excavate it down and then put a cap. Why not just fill it up?

MR. PANCOAST: Well, we -- it's an engineering thing. It's just a matter of, what's the cost of the material we have to place in there, and how high do we bring it up. We should maybe knock down some of the side walls and that sort of thing to achieve that fill. It's simply, some engineering studies have to be done, and how many truckloads you have to bring and dump in --

UNIDENTIFIED SPEAKER: Well, I know. I'm an engineer, and I own a construction company. So I load my share of dirt. I'm just thinking from the standpoint of keeping the water out of it rather than sloping it down and then trying to put the operation in place. Rather than systems in it, it would make more sense to put it up above the ground and put a clay cap on top. For crying out loud. We're out there in Ravensdale. There is a sand mine that has got a mountain of clay in it.

MR. PANCOAST: Right. And there is also some down underneath the power lines. There is also some there.

UNIDENTIFIED SPEAKER: Right. Build it up above the ground. It seems like it would be a better plan, to me.

MR. PANCOAST: We have designs in all different aspects. I'm sure that will come up in the engineering design report. Many of our designs do show a slight crown effect to what is there now, so it's just a matter of what looks the best when engineers get ahold of it.

UNIDENTIFIED SPEAKER: We simply haven't designed the storm water system in detail yet. There is two or three -- you know, there is a half-a-dozen ways to do it, and we just need to look at the various ways of what seems to be the best of accomplishing the purpose. And we simply haven't picked a detailed design.

MR. PANCOAST: Right. These are conceptual designs.

UNIDENTIFIED SPEAKER: That's exactly what we're going to do. We're going to keep surface water from getting in -- into the cap. But the details, we haven't picked out.

MR. PANCOAST: Once we get a detailed decision and final on something, then we do the detailing of engineering designs. So something will be different, I'm sure.

UNIDENTIFIED SPEAKER: Okay. Your plan, then, is, basically, to try to encapsulate the demolition, and then 20 years to monitor migration off-site. What's your contingency plan if migration occurs?

MR. PANCOAST: Well, we've developed several of them, and those are the ultimate goals. Part of them. But with the flows that we've got, and the position of the wells, we're in a position where we need to do some recycling systems to, basically, pump the material back up and recycle the water through the system slightly; buy us some time. And now our wells are also positioned to do treatment if required. So we could look at, potentially, some ground water treatment out of the system if necessary.

So we've got some short-term impressions to allow us to probably recycle -- you know, get some sort of system in place. We also have the ability to do some treating.

UNIDENTIFIED SPEAKER: So if you did detect some PCBs and some metals --

MR. PANCOAST: PCBs is probably one of those that just loves sticking to carbon.

UNIDENTIFIED SPEAKER: I know it is. I know it is. And if some of it did migrate out and get into your well, then you are in the position to apply remediation on it.

MR. PANCOAST: Right.

UNIDENTIFIED SPEAKER: Is there anything like that, that you can do underground now? Is there technology that you can put something down there like that?

MR. PANCOAST: Well, the best thing that everybody uses is --

UNIDENTIFIED SPEAKER: Charcoal. I know.

MR. PANCOAST: And you're sitting in a mine full of it. So really, for PCBs, I don't think you're going to see much migration of PCBs, you know. If anything, it would be maybe -- some solvents are other things you might see. But maybe -- you know, we haven't seen any of those.

UNIDENTIFIED SPEAKER: But you talked about the flow rate of fairly fine liquids that go in there, other than tars or something. And say you pour water in. And within a few hours, it's run out the bottom. So it's pretty logical to assume that any liquid that's going to run out of there has already run out of there.

MR. PANCOAST: Sure.

UNIDENTIFIED SPEAKER: In evaluating the different alternatives, did you assume that the soil that would have to be excavated and disposed of was contaminated?

MR. PANCOAST: We looked at several different volumes when we were digging up the material in the bottom, because to really get down in the trench and work -- you know, things have kind of fallen down this very narrow slot. So you're looking at probably, you know, a back hoe kind of operation -- or, not a back hoe, but a drag line -- or, clam shells. So you would have to

boom and throw this thing down and scoop it up. The effect of that is -- scooping it up, is, things tend to rupture. It's very difficult to move things in place. So we did look at a fairly good volume of soil that would be affected. So you're looking at, eventually, things could collapse and rupture and squeeze and kind of mess this stuff up along the trench. You would, essentially, generate more contaminated soils.

UNIDENTIFIED SPEAKER: I'm kind of reacting to what I heard. And it appears as if your ground water monitoring isn't showing any migration. You're not finding the contaminants. But on the other hand, you know, from what you're saying, you suspect they are there, you know, because you would create contamination in the process of removing, excavating, and disposing. And I'm just wondering how you know you've reconciled --

MR. PANCOAST: Right. We know there is contamination there. Some form of it.

UNIDENTIFIED SPEAKER: Plus, the ground water system appears to be a rapid-moving system.

MR. PANCOAST: Right.

UNIDENTIFIED SPEAKER: So when these vessels, or drums, rupture, then there is a high potential of this material, you know, being moved rapidly through the soil system, you know, into the ground water.

MR. PANCOAST: Right.

UNIDENTIFIED SPEAKER: So I mean, does the report address all that?

MR. PANCOAST: We discussed it in there. I mean, typically, if you're talking about a liquid within the drum, a typical model in a landfill -- we've used a model extensively, and massive studies have been done. We start to pinpoint. So it's not an analogy like someone squeezed a drum or something, and a gush of stuff came out and went down. We start with very small pinpricks. And so over time, you get, basically, an increase; more and more drips out of the drums as liquids. You begin to pick it up fairly early in the system; the monitoring system. It's telling you something is happening.

The other side of the coin is, probably most of the material locally is less liquid than a lot of sludges and stuff. Most of the drums, when they did the excavation, or removal activity, a vast majority of the drums just became sludges and things. And many of the drums -- most of the drums had holes and were damaged, and bullet holes, and everything else that was there.

The number of intact drums that probably contained some sort of liquid is relatively minor now. They probably are squished, banged-up, bunged-up drums that have a bunch of sludge and debris. That is probably the model thing that's in there.

UNIDENTIFIED SPEAKER: I'm just thinking in terms of, the material hasn't moved much, and that it's a matter of a localized soil mass being contaminated. It would seem like it would be timely to attempt, at least on some type of scale, to try

a pilot project of excavating and removing that; you know, to ascertain whether or not that's an effective method.

MR. PANCOAST: Well, that is probably what they did when they removed 116 drums, because it was looking at, you know, how easy is this to get these drums out of here. And they found it was fairly extensive. It's very steep slopes. Things have to be hauled up. They had workers down there. They, basically, got the drums that were easy to get to, sampling soils that were in those drums.

A lot of those drums were placed, and then they took bulldozers and pushed soil over them and had logs on top of them. As they set down in the mine, another batch of drums, a little bunch of dirt. So it's not like they were all sitting there, and go in and get them and get the soil around them; get a few drums and get eight or 10 feet of dirt or three feet of dirt, five feet of dirt, or whatever it is, get a few more, dig some more. And in the process of digging down in there, with people down there -- you have to use, again, some sort of clam shells -- you would generate a lot more contaminated soil. You have to lay back the mine. You're going to have to have staging areas to process the soil and that sort of stuff. So the ecological impacts are fairly significant, of trying to go in there and get things.

UNIDENTIFIED SPEAKER: Safety is very key. It's just like, that I have heard that it's probably close to collapse. It's very dangerous. And the possibility of accidents or injury or death is definitely there.

UNIDENTIFIED SPEAKER: What alarms me is, from what's said now, the materials there, potentially it's going to move, you know. You know, where it goes, the ultimate fate is something of concern, you know, because it's sitting there, and it's movable, you know, over time, and it's going to move through the system. The system is not --

MR. PANCOAST: It's not going to move through the system very much. The sludge is the driving force.

UNIDENTIFIED SPEAKER: That's the key thing about the cap, is, if it were really mobile, we would have expected -- this thing has been unprotected for, what, 20-some years now. And we haven't seen something going out, so there is nothing terribly mobile in there.

If you look, at the time -- you know, if you look over time, drum failures, rusting out, so forth, after 10 years, you don't expect to see any intact drums. So if there was something really mobile in there, we would have expected to see evidence of it by now. That says that what's left the mine is not overly mobile, or maybe it is already immobilized either by the coal or because of its own nature.

And a lot of sludges don't tend to go anywhere. PCBs aren't very water-soluble. They are almost insoluble. So the mechanism for some contaminant getting out of that would be rainwater coming through it and dragging it out. But if you remove that driving

force, we have, essentially, eliminated the mobility. That's the whole rationale behind this low-permeability cap, is, keep out the driving force that's not really mobile to begin with.

MR. PANCOAST: A lot of these were, probably, the waste TPH, or it was petroleum and that stuff, and that -- that, basically, over time, gets processed by nature. It's broken down. So this is some aspect of this system, also. But it's a-ways -- a little ways to the water table. There is a lot of absorbent capacity there. Remove the driving force by not having wind, water, essentially, riding this stuff down to the water table, and remove the drying mechanism and, basically, have it contained within this sort of whole mass underneath the cap.

MR. MORELL: But even before we slant the top, even before we sample the ground water, we would be surprised at what we found. The way we would treat ground water contaminated particularly with organics (sic), would be to send it to a carbon filter system because it would absorb it and contain it. That's what we have, essentially, here, right in the mine, is a carbon inversion system. It has a tremendous capacity among the mass of material there, compared to the mass of 4,500 drums, 200,000 gallons of water with some oil in it. The absorbent capacity of this thing is tremendous. We would be surprised, before we even sank the wells, to find it.

UNIDENTIFIED SPEAKER: Metal contamination, also.

MR. MORELL: Well, that's brings up a good issue, because metal won't absorb the carbon.

UNIDENTIFIED SPEAKER: Metal won't absorb the carbon?

MR. MORELL: Most of the metals. But they are -- surrounding these clay beds are clay or shale, which are clay beds -- clay stone -- which have a high absorbent capacity for metals. So we also have a very massive absorbing medium for metal contained in water.

UNIDENTIFIED SPEAKER: Of course metals aren't water-soluble, anyway.

MR. MORELL: Well, all of these things are, certainly, water-soluble to a degree.

MR. SOUTH: Metals can be solubilized if the water becomes acid.

UNIDENTIFIED SPEAKER: Metal solubility is very complex because there are some metals that are very soluble; other ones that are not as soluble. It depends on a lot of things. But the thing, basically, is, to be -- it has to be solubilized out of the mine site to get to the waters. As it moves through -- water moves through this mine readily. But solvents, constituents, or even simple solvents do not.

MS. MELEWSKI: In looking at the RI/FS, some of the key words that really stuck out, to me, are "potential" and "at this time," and it's really obvious that there will always be the potential of chemicals exiting, you know, whether you did No. 9 or

did No. 5. I mean, either way, there is always -- that's always going to be there.

And you know, if -- if you did No. 5, who is saying an act of Mother Nature, say, a major earthquake or something, isn't going to open up seams, and who knows what's going to get out. Because we know there is bad stuff in there. We saw it in the reports from the initial testing. And it's there, and it will always be there, and it's always, you know, got that potential.

MR. PANCOAST: Well, the cap is easily fixable with your scenario of an earthquake. That's the benefit, is that you can go back and fix things, and you can monitor.

MS. MELEWSKI: I guess that's where the "20 years" bothers me, you know. I see, you know, it's always there, so it should be indefinite. Not a time of 20 years. To me, that's a very short period of time.

MS. DEPPMAN: Is there a time limit on liability, David, in the laws, for this?

MR. SOUTH: I'd have to review the exact regulatory language on that, but that would be -- part of the Cleanup Action Plan will be the basic ideas of the ground water monitoring and the operations and maintenance of whatever is chosen, and how long that will last. I believe, currently, a hazardous waste landfill in Washington State that accepts hazardous waste -- and this should be Washington Administrative Code 173.303. The dangerous waste laws indicate a 30-year monitoring period after closure. I'd have to check that. I'm not 100 percent sure that it's 30 years. It might be 20 -- it is 30. It's 20 years for old municipal waste landfills. I think it's back up to 30 years under the new municipal waste landfill regulations. And the last waste that we have record of was placed in this area in about 1978. But we've made no decision on the length of time of the monitoring or the monitoring program.

MS. DEPPMAN: Just to maybe help out is, if, after 20 years of monitoring, nothing is found, then nothing more would be required; is that right?

MR. SOUTH: We have not reached a decision on the monitoring period. Often we have a periodic review. But if it were, say, a 20-year monitoring period, the general thought is, after that period, the monitoring ceases. A lot of that is for landfills. But in this case, I'd have to review the regulations to see the exact -- I just don't have that off the top of my head. But I think that's -- make that comment, if you would, during the comment period. And that way -- because all the formal comments -- and that's coming. Even if you've asked a question, if you want to get a comment on the record, I will prepare a responsiveness summary, a formal document, that goes in the record, and everybody who commented will get a copy of that, and it will probably be placed in the public repositories, as well, for the others. And anybody who wants it can call up and request a copy. But you know, make that comment during the formal comment